WHAT IS CLAIMED IS:

1. A method comprising the steps of:

   a) providing a plurality of functionalized carbon nanotubes; and

   b) irradiating said functionalized carbon nanotubes so as to effect their defunctionalization.

2. The method of Claim 1, wherein the functionalized carbon nanotubes are single-wall carbon nanotubes.

3. The method of Claim 1, wherein the functionalized carbon nanotubes are fluorinated carbon nanotubes.

4. The method of Claim 1, wherein the functionalized carbon nanotubes are dispersed throughout a host matrix.

5. The method of Claim 4, wherein the host matrix is polymeric.

6. The method of Claim 4, wherein the host matrix is a fluid.

7. The method of Claim 1, wherein said functionalized carbon nanotubes are irradiated with radiation selected from the group consisting of ultraviolet radiation, infrared radiation, X-ray radiation, gamma-ray radiation, protons, neutrons, electrons, alpha particles, heavy ions, cosmic radiation, solar wind, and combinations thereof.

8. A method comprising the steps of:

   a) providing a plurality of functionalized carbon nanotubes; and

   b) irradiating said functionalized carbon nanotubes so as to alter their properties.

9. The method of Claim 8, wherein the carbon nanotubes are single-wall carbon nanotubes.

10. The method of Claim 8, wherein the functionalized carbon nanotubes are fluorinated carbon nanotubes.

11. The method of Claim 8, wherein the functionalized carbon nanotubes are dispersed throughout a host matrix to form a composite material.

12. The method of Claim 11, wherein the host matrix is polymeric.

13. The method of Claim 11, wherein the host matrix is a fluid.

14. The method of Claim 8, wherein said functionalized carbon nanotubes are irradiated with radiation selected from the group consisting of ultraviolet radiation, infrared radiation, X-ray radiation, gamma-ray radiation, protons, neutrons, electrons, alpha particles, heavy ions, cosmic radiation, solar wind, and combinations thereof.

15. The method of Claim 8, wherein the properties being altered upon exposure to radiation are selected from the group consisting of electrical properties, mechanical properties, chemical properties, and combinations thereof.

16. The method of Claim 11, wherein an alteration of the carbon nanotube properties is coupled to an alteration of the properties of the composite material.

17. A method comprising the steps of:

a) dispersing functionalized carbon nanotubes in a solvent to form a dispersion of functionalized carbon nanotubes;

b) incorporating the dispersion of functionalized carbon nanotubes into a polymer host matrix to form a functionalized carbon nanotube-polymer composite; and

c) modifying the functionalized carbon nanotube-polymer composite with radiation.

18. The method of Claim 17, wherein the carbon nanotubes are single-wall carbon nanotubes.

19. The method of Claim 17, wherein the functionalized carbon nanotubes are fluorinated carbon nanotubes.

20. The method of Claim 17, wherein the dispersion is formed with a solvent selected from the group consisting of alcohols, *N,N*-dimethylformamide, benzene, toluene, xylene, dichlorobenzene, chloroform, dichloromethane, and combinations thereof.

21. The method of Claim 17, wherein the step of incorporating the dispersion of functionalized carbon nanotubes into a polymer host matrix comprises an incipient wetting of polymer material, of a form selected from the group consisting of particles, fibers, and combinations thereof, followed by solvent removal and blending.

22. The method of Claim 17, wherein the step of incorporating the dispersion of functionalized carbon nanotubes into a polymer host matrix comprises mixing the dispersion with polymeric precursors and polymerizing in situ.

23. The method of Claim 17, wherein functionalized carbon nanotubes comprise from about 0.001 weight percent to about 99 weight percent of the functionalized carbon nanotube-polymer composite.

24. The method of Claim 17, wherein functionalized carbon nanotubes comprise from about 0.2 weight percent to about 30 weight percent of the functionalized carbon nanotube-polymer composite.

25. The method of Claim 17, wherein the step of modifying the functionalized carbon nanotube-polymer composite with radiation comprises radiation selected from the group consisting of ultraviolet radiation, infrared radiation, X-ray radiation, gamma-ray radiation, protons, neutrons, electrons, alpha particles, heavy ions, cosmic radiation, solar wind, and combinations thereof.

26. The method of Claim 17, wherein the step of modifying the functionalized carbon nanotube-polymer composite with radiation comprises a modification selected from the group consisting of crosslinking, curing, vulcanization, hardening, surface hardening, changes in electrical properties, defunctionalization, and combinations thereof.

27. A method for radiatively-altering the properties of functionalized carbon nanotubes-polymer composites, wherein alteration occurs over a period of time so as to effect time-dependent properties for the material.

28. The method of Claim 27, wherein the functionalized carbon nanotubes-polymer composites are radiatively-altered in space.

29. A device comprising:

a) a host material; and

b) carbon nanotubes selected from the group consisting of functionalized carbon nanotubes, unfunctionalized carbon nanotubes, and combinations thereof, wherein the carbon nanotubes are dispersed throughout the host material and wherein the electrical properties of said carbon nanotubes are defined by their level and type of functionalization.

30. The device of Claim 29, wherein the host material is selected from the group consisting of metals, ceramics, semiconductors, alloys, metalloids, polymers, fluids, oils, waxes, solvents, and combinations thereof.

31. The device of Claim 29, wherein the functionalized carbon nanotubes are dispersed homogeneously throughout the host material.

32. The device of Claim 29, wherein the carbon nanotubes are single-wall carbon nanotubes.

33. The device of Claim 29, wherein the functionalized carbon nanotubes are fluorinated carbon nanotubes.

34. The device of Claim 29, wherein the functionalized carbon nanotubes are less electrically conductive than their unfunctionalized counterparts.

35. The device of Claim 29, wherein the functionalized carbon nanotubes are more electrically conductive than their unfunctionalized counterparts.

36. A sensor comprising:

a) a layer of functionalized carbon nanotube-polymer composite material; and

b) a device capable of monitoring the radiation-sensitive electrical properties across the layer of functionalized carbon nanotube-polymer composite material.

37. The sensor of Claim 36, wherein the layer of functionalized carbon nanotube-polymer composite material comprises a thickness which ranges from about 10 nm to about 10 mm.

38. The sensor of Claim 36, wherein the layer of functionalized carbon nanotube-polymer composite material comprises a functionalized carbon nanotube content which ranges from about 0.001 weight percent to about 99 weight percent.

39. The sensor of Claim 36, wherein the layer of functionalized carbon nanotube-polymer composite material comprises a functionalized carbon nanotube content which ranges from about 0.2 weight percent to about 30 weight percent.

40. The sensor of Claim 36, wherein the carbon nanotubes are single-wall carbon nanotubes.

41. The sensor of Claim 36, wherein the functionalized carbon nanotubes are fluorinated carbon nanotubes.

42. The sensor of Claim 36, wherein the device capable of monitoring the radiation-sensitive electrical properties across the layer of functionalized carbon nanotube-polymer composite material is selected from the group consisting of a multimeter, a voltmeter, a four-point electrical probe, and combinations thereof.

43. The sensor of Claim 36, wherein the device capable of monitoring the radiation-sensitive electrical properties is calibrated such that radiation interactions can be quantified.

44. The sensor of Claim 36, produced by an ink jet printing technique.

45. A method of sensing comprising the steps of:

a) exposing a layer of functionalized carbon nanotube-polymer composite material to radiation; and

b) monitoring the manner in which the electrical properties of said layer of functionalized carbon nanotube-polymer composite material changes as a function of radiation exposure time.

46. The method of Claim 45, wherein the layer of functionalized carbon nanotube-polymer composite material comprises a thickness which ranges from about 10 nm to about 10 mm.

47. The method of Claim 45, wherein the layer of functionalized carbon nanotube-polymer composite material comprises a functionalized carbon nanotube content which ranges from about 0.001 weight percent to about 99 weight percent.

48. The method of Claim 45, wherein the layer of functionalized carbon nanotube-polymer composite material comprises a functionalized carbon nanotube content which ranges from about 0.2 weight percent to about 50 weight percent.

49. The method of Claim 45, wherein the carbon nanotubes are single-wall carbon nanotubes.

50. The method of Claim 45, wherein the functionalized carbon nanotubes are fluorinated carbon nanotubes.

51. The method of Claim 45, wherein the functionalized carbon nanotube-polymer composite material comprises a polymeric material selected from the group consisting

of thermoplastics, thermosets, co-polymers, elastomers, silicones, fluorinated polymers, epoxies, and combinations thereof.

52. The method of Claim 45, wherein the step of exposing a layer of functionalized carbon nanotube-polymer composite material to radiation effects a defunctionalization of the functionalized carbon nanotubes.

53. The method of Claim 45, wherein the step of monitoring the electrical properties involves monitoring a property selected from the group consisting of conductance, conductivity, resistance, resistivity, and combinations thereof.

54. A device comprising:

a) a polymer host matrix;

b) functionalized carbon nanotubes, wherein said device functions through time-dependent changes induced by exposure to radiation.

55. The device of Claim 54, wherein the polymer host matrix is selected from the group consisting of thermoplastics, thermosets, co-polymers, elastomers, silicones, fluorinated polymers, epoxies, and combinations thereof.

56. The device of Claim 54, wherein the functionalized carbon nanotubes comprise fluorinated single-wall carbon nanotubes.

57. A material designed for resisting effects of exposure to environmental conditions that becomes more resistant as a result of said exposure.

58. A process for rapid prototyping of carbon nanotube composites, wherein functionalized carbon nanotubes are used in place of nonfunctionalized carbon nanotubes to impart a viscosity that is more favorable to the process.

59. The process of Claim 58, wherein the functionalized carbon nanotubes are subsequently defunctionalized.